USER MANUAL

MMX3232

PTN Modular Matrix Switcher 32x32

Version: MMX32322013V1.1

NOTICE: Please read this user manual carefully before using this product.

This manual is for operation instruction only, not for any maintenance usage. The functions described in this version are updated till May 2013. Any changes of functions and parameters since then will be informed separately. Please refer to the dealers for the latest details.

All product function is valid till 2013-05-24.

Update History

Version	Date	Update Content
1.0	2012.12.22	First Version.
1.1	2013.05.24	Modified the system diagram.

Table of Contents

1. Introduction

1.1. About MMX3232

MMX3232 is a high performance video and audio modular matrix switcher. Various changeable cards make MMX matrix flexible and all-in-one solution for different projects. It can support different video signals with cross switching.

There are two series of changeable cards work with MMX matrix, input card MMX-4I series and output card MMX-4O series; all the cards support hot plug & play. Users can choose the right card for different application. There are different signal card is used for processing different video signal, including: HMDI, DVI, VGA, SDI and HDMI TP etc.

MMX3232 matrix can be used for different project, because of its changeable card design. It is the combo solution for multimedia conference rooms, control rooms, broadcasting rooms, shopping center etc. It will handle all the audiovisual management, including the switching, driving, scaling etc.

1.2. MMX Modular Matrix Switcher Models

Spec / Models	Height	Maximum Slot	Power supplies	RS232 control	Network control
MMX88A	2U	2 input card slots & 2 output card slots	Single	√	Optional
MMX1616	3U	4 input card slots & 4 output card slots	Dual	√	Optional
MMX3232	5U	8 input card slots & 8 output card slots	Dual	√	Optional
MMX6464	10U	16 input card slots & 16 output card slots	Dual	√	Optional

1.3. MMX signal card (changeable cards)

To meet different situation and users, the MMX3232 cards are classified into the following models:

MMX input cards

Spec / Models	Inputs	Signal Format
MMX-4I-HD	4	HDMI
MMX-4I-DV	4	DVI
MMX-4I-VG	4	VGA
MMX-4I-SD	4	SDI
MMX-4I-TP	4	RJ45

MMX output cards

Spec / Models	Outputs	Signal Format
MMX-4O-HD	4	HDMI
MMX-4O-DV	4	DVI
MMX-4O-SD	4	SDI
MMX-4O-TP	4	RJ45

1.4. Package Contents

- 1 x MMX3232
- 1 x Power Cord
- 1 x IR remote (The cell battery is not included)
- 4 x Plastic cushions
- 1 x RS232 cable
- 1 x User manual

2. Features

- Modular chassis with configurable I/O slots, ranging from 4x4 to 32x32.
- Various I/O cards, includes HDMI, HDBaseT, SD/HD/3G-SDI, DVI and VGA cards (Compatible with YUV, YC & CVBC.) to configure any matrix.
- Truly cross-point switching, any input to any output, regardless signal format.
- Advanced EDID management, 2 ways to guarantee maximum compatibility.
- Support HDMI1.4a, support 3D.
- Integrated HDBaseT technology.
- I/O cards works directly with CATx extender.
- Ultra-switching for instaneous display, ensures the transition runs smoothly.
- Unique pixel accurate re-clocking technology, providing exceptional output transmission and accurate timing.
- Controllable via button, RS232 & TCP/IP, also compatible with 3rd parties control.
- Field-upgradeable and hot-swappable, friendly to use and maintain.
- HDCP compliant.
- LCD display.

3. Specification

3.1. Main Unit

Control parts			
Serial control port	RS-232, 9-pin female D connector	Pin Configurations	2 = TX, 3 = RX, 5 = GND
Installation	Rack Mountable	Front panel control	Buttons
Options	TCP/IP control by PTNET(PTN's programmable interface)		
General			
Power Supply	100VAC ~ 240VAC, 50/60Hz	Power Consumption	200W
Temperature	-20 ~ +70℃	Humidity	10% ~ 90%
Case Dimension	W482.6 x H221.5 x D320mm (5U high)	Product Weight	5Kg

3.2. Changeable Cards

3.2.1. MMX-4I-DV & MMX-4O-DV

Input		Output	
Input	4 DVI	Output	4 DVI
Input Connector	Female DB24+5	Output Connector	Female DB24+5
Input Level	T.M.D.S. 2.9V/3.3V	output Level	T.M.D.S. 2.9V/3.3V
Input Impedance	75Ω	Output Impedance	75Ω
General			
Gain	0 dB	Bandwidth	6.75 Gbit/s
Video Signal	DVI 1.0/HDMI 1.4a full digital T.M.D.S signal	Max Time-delay	5nS (±1nS)
Switching Speed	200ns (Max.)	Crosstalk	<-50dB@5MHz
EDID and DDC	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) data using DVI and HDMI 1.4a standards. EDID and DDC signals are actively buffered		
HDCP	Compliant with HDCP using DVI and HDMI 1.4a standards		

3.2.2. MMX-4I-HD & MMX-4O-HD

Input		Output	
Input	4 HDMI	Output	4 HDMI
Input Connector	Female HDMI	Output Connector	Female HDMI

Input Level	T.M.D.S. 2.9V/3.3V	output Level	T.M.D.S. 2.9V/3.3V
Input Impedance	75Ω	Output Impedance	75Ω
General			
Gain	0 dB	Bandwidth	6.75 Gbit/s
Video Signal	DVI 1.0/HDMI 1.4a full digital T.M.D.S signal	Max Time-delay	5nS (±1nS)
Switching Speed	200ns (Max.)	Crosstalk	<-50dB@5MHz
EDID and DDC	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) data using DVI and HDMI 1.4a standards. EDID and DDC signals are actively buffered		
HDCP	Compliant with HDCP using DVI and HDMI 1.4a standards		

3.2.3. MMX-4I-VG

Input			
Input	4 VGA	Input Level	0.5 ~ 2.0Vp-p
Input Connector	Female 15 pin HD	Input Impedance	75Ω
General			
Gain	0 dB	Bandwidth	350MHz (-3dB), fully load
Video Signal	VGA-UXGA, RGBHV, RGBS, RGsB, RsGsBs, component video, S-video & C-video.		
Switching Speed	200ns (Max.)	Crosstalk	<-50dB@5MHz

3.2.4. MMX-4I-SD & MMX-4O-SD

Input		**Output**	
Input	4 SDI	Output	4 SDI
Input Connector	Female BNC	Output Connector	Female BNC
Input Level	0.8Vp-p ± 10%	output Level	0.8Vp-p ± 10%
Input Impedance	75Ω	Output Impedance	75Ω
General			
Gain	Unity	Maximum Data Rate	2.97 Gbps
Transmission Distance	300M (Max.)	Data rate Lock	Auto
Input Return	<-14 dB @ 1 MHz ~	Data Type	8bit, 10bit

Loss	1.5 GHz		
Video Standard	SMPTE 292M, SMPTE 259M, SMPTE 424M, ITU-RBT.601, ITU-RBT.1120		

3.2.5. MMX-4I-TP & MMX-4O-TP

Video Input		**Video Output**	
Input	4 RJ45, 4 IR & 4 RS232	Output	4 RJ45, 4IR&RS232
Input Connector	Female RJ45 3.5mm mini jack for IR 3 poles captive screw connector for RS232	Output Connector	Female RJ45 3.5mm mini jack for IR 3 poles captive screw connector for RS232
Input Impedance	75Ω	Output Impedance	75Ω
Video General			
Gain	0dB ~ 10dB@100MHz	Bandwidth	6.75Gbps
Resolution range	800x600 ~ 1920x1200	Transmission Distance	70M(Max)
SNR	>70dB@ 100MHz-100M	Return Loss	<-30dB@ 5KHz
THD	＜0.005%@1KHz	Min.～Max. Level	＜0.3V ~ 1.45Vp-p
HDMI Standard	Support HDMI1.4a and HDCP	Differential Phasic Error	±10° @ 135MHz_100M

4. Operations of the Front Panel

There are two parts in the front panel.

1) System monitor: the system switching and status monitor.
2) Crystal buttons: with green back-light indicating, including I/O buttons and function buttons.

Buttons	Function Description
INPUTS	Input buttons. It is the number of every input channel (32channels in total), ranging from "0" to "9".
OUTPUTS	Output buttons. It is the number of every output channel (32channels in total), ranging from "0" to "9".
AV	AV synchronal button: To transfer video and audio signal synchronously by the switcher. Operation: Press buttons in this order “3”, “AV”, “4”.
,	Division button: to divide the output channels when switching to more than one channel. Example: To transfer input 1 to output 1,8,15, you need to press this button between each two output channels.
ENTER	Confirmation button: Confirm the switching operation. The operation will not be executed by the matrix without confirmation.
ALL	All button: To transfer an input channel to all output channels. Example1: To transfer video and audio signals from input channel No.12 to all output channels Operation: Press buttons in this order “12”, “ALL” Example2: To transfer all input signals to the corresponding output channels respectively. In another word, to switch to this status: 1->1, 2->2, 3->3, 4->4…32->32. Operation: Press buttons in this order “ALL”, “THROUGH”
THROUGH	Through button: To transfer the signals directly to the corresponding output channels Example: To transfer the signals from input channel No. 3 to their corresponding output channels Operation: Press buttons in this order “3”, “THROUGH”
UNDO	Undo button: To resume to the status before the command just performed
⇦	Backspace button: To backspace the latest input button

Switching Operation:

With the front control panel, the MMX matrix could be control directly and rapidly by pressing the buttons under below format.
“**Input Channel**” + “**Switch Mode**” +“**Output Channel**”+“**Enter**”

1) “Switch Mode”: Audio & Video synchronal or break away switching mode, which includes button “AV”.

2) “Input Channel”: Fill with the number of input channel to be controlled

3) “Output Channel”: Fill with the number of output channels to be control

4) MMX3232 needs to use “,” button to separate multiple outputs, and “ENTER” button to confirm the operation.

5) The input/output channels on the rear panel are counting from left to right, top to bottom. And if the input/output channel is two digits number, the input delay time between two numbers must less than 5 seconds; otherwise the operation will be cancelled.

5. External Connection

5.1. Introduction of the Input and Output Connectors

There are maximum 16 card slots in the rear panel, including 8 input slots and 8 output slots.

Remarks: The cards in the pictures are only for reference; user can choose different cards in different case, supporting plug and play.

5.2. Changeable Cards Introduction & Installation

There are various changeable cards, which can insert to the MMX empty slot (hot-swop), include different signals, such as DVI, HDMI, VGA, twisted pair, SDI etc. Below is the one by one introduction for each card.

5.2.1. MMX-4I-DV & MMX-4O-DV

DVI signal card. (Please check the specification from *3.2.1*)

It is fully compatible with HDMI1.4a and HDCP, but not supporting analogy signal.

It is embedded the EDID management technology, supporting CEC, DDC.

MMX-4I-DV: input card, maximum four input signal. Input signal can pass to output device through MMX-4O-DV, or pass through other kinds of output cards.

MMX-4O-DV: output card, maximum four output signal. Output signal can come from MMX-4I-DV, or from other kinds of input cards.

Pin Layout of the DVI-I connector (Dual-Link). (Female)

PIN	Function	PIN	Function
1	T.M.D.S.Data2-	13	T.M.D.S.Data3+
2	T.M.D.S.Data2+	14	+5V Power
3	T.M.D.S. Data 2/4 Shield	15	Ground (for +5V)
4	T.M.D.S. Data 4-	16	Hot Plug Detect
5	T.M.D.S. Data 4+	17	T.M.D.S. Data 0－
6	DDC Clock	18	T.M.D.S. Data 0+
7	DDC Data	19	T.M.D.S. Data 0/5 Shield
8	No Connect	20	T.M.D.S.Data5－
9	T.M.D.S.Data1-	21	T.M.D.S.Data5＋
10	T.M.D.S.Data1+	22	T.M.D.S. Clock Shield
11	T.M.D.S.Data1/3 Shield	23	T.M.D. S. Clock +
12	T.M.D.S.Data3-	24	T.M.D.S .Clock－

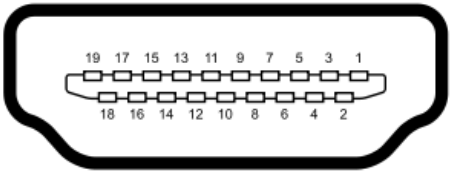
5.2.2. MMX-4I-HD & MMX-4O-HD

HDMI signal card. (Please check the specification from *3.2.2*)
It is embedded the EDID management technology, supporting CEC, DDC.
It is also compatible with DVI signal (HDCP required).
MMX-4I-HD: input card, maximum four input signal. Input signal can pass to output device through MMX-4O-HD, or pass through other kinds of output cards.

MMX-4O-HD: output card, maximum four output signal. Output signal can come from

MMX-4I-HD, or come from other kinds of input cards.

Pin layout of the HDMI connectors (female).

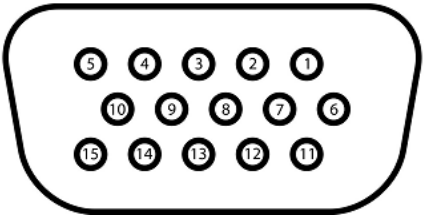


Pin Number	Signal Name	Pin Number	Signal Name
1	TMDS Data 2+	**20**	SHELL
2	TMDS Data 2 Shield	**19**	Hot Plug Detect
3	TMDS Data 2-	**18**	+5V Power
4	TMDS Data 1+	**17**	Ground
5	TMDS Data 1 Shield	**16**	DDC Data
6	TMDS Data 1-	**15**	DDC Clock
7	TMDS Data 0+	**14**	No Connect
8	TMDS Data 0 Shield	**13**	CEC
9	TMDS Data 0-	**12**	TMDS Clock-
10	TMDS Clock+	**11**	TMDS Clock Shield

5.2.3. MMX-4I-VG

VGA signal card. (Please check the specification from *3.2.3*)
Scale all inputs to 1080p.
Compatible with C-Video, YUV, YC (Factory preset function).
The bandwidth is up to 350MHz (-3dB);
Supporting RGBHV, RGsB, RGBS, RsGsBs, YUV, YC and Composite video.
MMX-4I-VG: input card, maximum four input signal. Input signal can pass to output device through any kinds of output cards.

Pin layout of the VGA connectors (female):



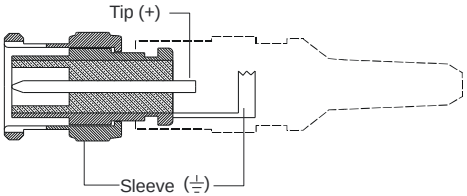
Pin Number	Signal Name	Pin Number	Signal Name
Pin 1	RED	Pin 9	KEY/PWR
Pin 2	GREEN	Pin 10	GND
Pin 3	BLUE	Pin 11	ID0/RES
Pin 4	ID2/RES	Pin 12	ID1/SDA
Pin 5	GND	Pin 13	HSync
Pin 6	RED_RTN	Pin 14	VSync
Pin 7	GREEN_RTN	Pin 15	ID3/SCL
Pin 8	BLUE_RTN		

5.2.4. MMX-4I-SD & MMX-4O-SD

SDI signal card. (Please check the specification from *3.2.4*)
It is compatible with different SDI signal formats, including SD/HD/3G-SDI (adaptive)
Every port has loop output for local monitoring.
MMX-4I-SD: input card, maximum four input signal. Input signal can pass to output device through MMX-4O-SD, or pass through other kinds of output cards.

MMX-4O-SD: output card, maximum four output signal. Output signal can come from MMX-4I-SD, or come from other kinds of input cards.

The BNC connector is shown as the figure below.



BNC Connector

5.2.5. MMX-4I-TP & MMX-4O-TP

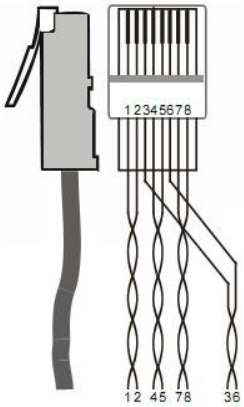
Twisted pair card (HDMI/DVI extender). (Please check the specification from *3.2.5*)
Support HDTV, compatible with HDMI1.4a and HDCP

MMX-4I-TP: input card, maximum input four HDMI TP signal. Input signal can pass to output device through MMX-4O-TP, or pass through other kinds of output cards, need to work with TPHD402T.

MMX-4O-TP: output card, maximum output four HDMI TP signal. Output signal can come from MMX-4I-TP, or come from other kinds of input cards, need to work with TPHD402R.

Pin layout of the RJ45 connectors:
Two different connection standards can be chose; the connectors of same cable should use the same standard.

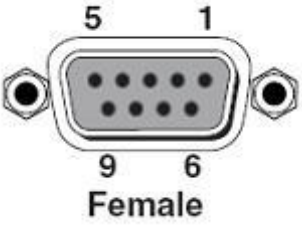
TIA/EIA T568A			TIA/EIA T568B	
Pin	Cable color		Pin	Cable color
1	green white		1	orange white
2	green		2	orange
3	orange white		3	green white
4	blue		4	blue
5	blue white		5	blue white
6	orange		6	green
7	brown white		7	brown white
8	brown		8	brown



Notice: Cable connectors MUST be metal one, and the shielded layer of cable MUST be connected to the connector's metal shell, to well share the grounding.

5.3. Connection of RS-232 Communication Port

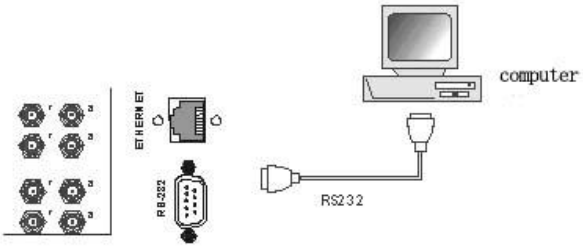
Except the front control panel, the MMX matrix can be controlled by far-end control system or through the Ethernet control via the RS-232 communication port.
This RS-232 communication port is a female 9-pin D connector. The definition of its pins is as the table below.



No.	Pin	Function
1	N/u	Unused
2	Tx	Transmit
3	Rx	Receive
4	N/u	Unused
5	Gnd	Ground
6	N/u	Unused
7	N/u	Unused
8	N/u	Unused
9	N/u	Unused

5.4. Connection with Computer

When the MMX matrix connects to the RS232 port of a computer with control software, users can control it by that computer. To control the switcher, users need to use RS232 control software.

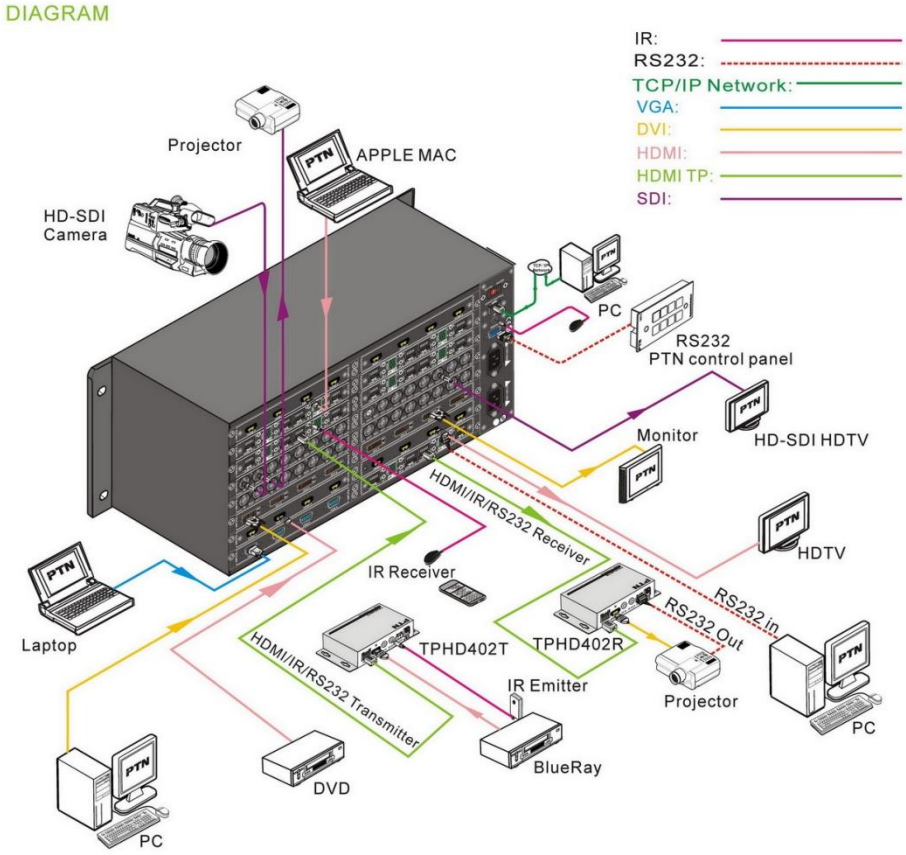


Connection between MMX matrix and computer

5.5. Connection of TCP/IP Communication Port (Optional Function)

The MMX matrix can work with the PTN model “PTNET”, to enable the TCP/IP function. The PTNET is a programmable RCP/IP to RS232 processor, which is built in the FTP and fixed IP address inside and working compatible with internet.
For more details, please check the user manual of PTNET.

6. System Diagram



7. Communication Protocol and Command Codes

With this command system, users are able to control and operate the MMMX Matrix with RS232 software remotely.

Communication protocol: Baud rate: 9600; Data bit: 8; Stop bit: 1; Parity bit: none.

Command Types	Command Codes	Functions
System Command	/*Type;	Inquire the models information.
	/%Lock;	Lock the keyboard of the control panel on the Matrix.
	/%Unlock;	Unlock the keyboard of the control panel on the Matrix.
	/^Version;	Inquire the version of firmware
	/:MessageOff;	Turn off the feedback command from the com port. It will only show the “switcher OK”.
	/:MessageOn;	Turn on the feedback command from the com port.
	Undo.	To cancel the previous operation.
	Demo.	Switch to the “demo” mode, 1->1, 2->2, 3->3 … and so on.
Operation Command	[x1]All.	Transfer signals from the input channel [x1] to all output channels
	All#.	Transfer all input signals to the corresponding output channels respectively.
	All$.	Switch off all the output channels.
	[x1]#.	Transfer signals from the input channel [x1] to the output channel [x1].
	[x1]$.	Switch off the output channel [x1].
	[x1] B[x2].	Transfer signal from the input channel [x1] to the output channel [x2].
	[x1] B[x2],[x3],[x4].	Transfer signal from the input channel [x1] to the output channels [x2], [x3] and [x4].
	Status[x1].	Inquire the input channel to the output channel [x1].
	Status.	Inquire the input channel to the output channels one by one.
	Save[Y].	Save the present operation to the preset command [Y]. [Y] ranges from 0 to 9.
	Recall[Y].	Recall the preset command [Y].
	Clear[Y].	Clear the preset command [Y].
	EDIDMInit.	Recover the factory default EDID data.

	EDIDM[X]B[Y].	Manually EDID management. Copy the EDID data of output[X] to the input[Y].
	PWON.	Normal working status.
	PWOFF.	Stand by status.
	HDCPON.	Turn on the HDCP output.
	HDCPOFF.	Turn off the HDCP output.
	PTNI[x]0622%.	Set the input channel [x] to support VGA signal input. (NOTE1)
	PTNI[x]0623%.	Set the input channel [x] to support YPbPr signal input. (NOTE1)
	PTNI[x]0624%.	Set the input channel [x] to support SVIDEO signal input. (NOTE1)
	PTNI[x]0625%.	Set the input channel [x] to support CVIDEO signal input. (NOTE1)
	PTNI[x]0626%.	Scale the resolution of input [x] to 1024*768. (NOTE1)
	PTNI[x]0627%.	Scale the resolution of input [x] to 1280*720. (NOTE1)
	PTNI[x]0628%.	Scale the resolution of input [x] to 1280*800. (NOTE1)
	PTNI[x]0629%.	Scale the resolution of input [x] to 1920*1080. (NOTE1)

Note:

1. These commands are for MMX-4I-VGA only; [x] is the channel of the matrix but not the channel of card. For MMX3232, [x] must be two Bytes.

2. [x1], [x2], [x3] and [x4] are the symbols of input or output channels ranged according to the model of the matrix switcher. If the symbols exceed the effective range, it would be taken as a wrong command.

3. In above commands, “[”and “]” are symbols for easy reading and do not need to be typed in actual operation.

4. Please remember to end the commands with the ending symbols “.” and “;”.

Detail Examples:

1、Transfer signals from an input channel to all output channels: [x1]All.

Example: “3All.” to transfer signals from the input 3 to all output channels.

2、Transfer all input signals to corresponding output channels respectively: All#.

Example: If this command is carried out, the status of matrix will be: 1->1, 2->2, 3->3,

4->4……32->32.

3、Switch off all the output channels: All$.

Example: After running this command, there will be no signals on all the outputs.

4、Switch off the detail feedback command from the COM port: /:MessageOff;

But, it will leave the “switch OK” as the feedback, when you switch the matrix.

5、Switch on the detail feedback command from the COM port: /:MessageOn;

It will show the detail switch information when it switch. Example: when switch 1->2, it will feedback “AV01 to 02”.

6、Transfer signals from an input channel to corresponding output channel: [x]#.

Example: “5#.” to transfer signals from the input5 to the output5.

7、Switch off an output channel: [x]$.

Example: “5$.” to switch off the output 5.

8、Switch signal: [x1] B[x2].

Example: “12B12,13,15.” to transfer signal from the input12 to the output No.12,13,15.

9、Inquire the input channel to the output channel [x]: Status[x].

Example: “Status23.” to inquire the input channel to the output23.

10、Inquire the input channel to the output channels one by one: Status.

Example: “Status.” to inquire the input channel to the output channels one by one.

11、Save the present operation to the preset command [Y]: Save[Y].

Example: “Save7.” to save the present operation to the preset command No.7.

12、Recall the preset command [Y]: Recall[Y].

Example: “Recall5.” to recall the preset command No.5.

13、Clear the preset command [Y]: Clear[Y].

Example: “Clear5.” to clear the preset command No.5.

14、EDID management command:. EDIDM[X]B[Y].

Example: “EDIDM5B3.” to copy the EDID data of the display on output5 to input3.

15、Command for MMX-4I-VGA: PTNI[X]***.**

Example: “PTNI070623%.” to set the input 7 to support YPbPr signal, the card is plugged in the second input slot of the matrix.

8. Safety Operation Guide

In order to guarantee the reliable operation of the equipments and safety of the staff, please abide by the following proceeding in installation, using and maintenance:

1) Unit must be earthed properly. Please do not use two blades plugs and ensure the alternating power supply ranged from 100v to 240v and from 50Hz to 60Hz.

2) Do not put the switcher in a place of too hot or too cold.

3) As the power generating heat when running, the working environment should be maintained fine ventilation, in case of damage caused by overheat.

4) Cut off the general power switch in humid weather or left unused for long time.

5) Before following operation, ensure that the alternating current wire is pull out of the power supply:

- Take off or reship any components of the equipment.
- Take off or rejoin any pin or other link of the equipment.

6) As to non-professional or without permission, please DO NOT try to open the casing of the equipment, DO NOT repair it on your own, in case of accident or increasing the damage of the equipment.

7) DO NOT splash any chemistry substance or liquid in the equipment or around.

9. Troubleshooting & Maintenance

1) When the output image in the destination device connected to MMX3232 has ghost, such as the projector output with ghost, please check the projector's setting or try another high quality connection cord.

2) When there is a color losing or no video signal output, maybe the connectors between the input and output end do not connect tightly.

3) When user cannot control the matrix switcher by computer through its COM port, please check the COM port number in the software and make sure the COM port is in good condition.

4) When switching , there is no output image:

- Check with oscilloscope or multimeter if there is any signal at the input end. If there is no signal input, it may be the input connection cord broken or the connectors loosen.
- Check with oscilloscope or multimeter if there is any signal at the output end. If there is no signal output, it may be the output connection cord broken or the connectors loosen.
- Please make sure the destination device is exactly on the controlled output channel.
- If it is still the same after the above checking, maybe there is something wrong in the switcher. Please send it to the dealer for fixing.

5) If the output image is interfered, please make sure the system is earthed well.

6) If the static becomes stronger when connecting the video connectors, it may be due to the incorrect earthling of the power supply, Please earth it again correctly, and otherwise it would bring damage to the switcher or shorten its natural life.

7) If the matrix switcher cannot be controlled by the keys on the front panel, RS232 port or IR remote, the unit may has already been broken. Please send it to the dealer for repairing.

10. After-sales Service

1) If there appear some problems when running the switcher, please check and deal with the problems reference to this user manual. Any transport costs are borne by the users during the warranty.

2) You can email to our after-sales department or make a call, please tell us the following information about your cases.
- Product version and name.
- Detailed failure situations.
- The system connections.

3) We offer products for all three-year warranty, which starts from the first day you buy this product (The purchase invoice shall prevail).

4) Any problem is same with one of the following cases listed, we will not offer warranty service but offer for charge.
- Beyond the warranty.
- Damage due to incorrectly usage, keeping or repairing.
- Damage due to device assembly operations by the maintenance company non-assigned.
- No certificate or invoice as the proof of warranty.
- The product model showed on the warranty card does not match with the model of the product for repairing or had been altered.
- Damage caused by force majeure.

Remarks: For any more questions or problems, please try to get help from your local distributor, or email PTN at support@PTN-electronics.com.